THIRD INSTAR: Average of 10 maggots—Length 3·25 mm., breadth 0·90 mm., colour somewhat brown. Enteroventral surface of head divided into two plates, each bearing antennae and maxillary palpi, the latter with ten sensory papillae, terminal three much longer than the rest. Chitinous labial plate light brown.

Pupa:

Average of 10 pupae—Length 2·09 mm., breadth 0·9 mm. Long oval and pale yellow when fresh, attains reddish brown or dark brown colour at the time of emergence of adult. Segments well defined, both the anterior and posterior spiracles prominent.

Adult:

Average of 10 adults of each sex—Length 3·2 mm. and 2·8 mm., breadth 9·0 mm. and 8·7 mm. of male and female respectively. Inter-orbital space and ventral region of face yellow, two sub-equal superior and one to two inferior orbital setae, third segment of antenna quadrate, slightly longer, colour black. Mesonotum black with a light grey bloom; pleural sutures narrowly yellow; femora, tibiae and tarsi dull black; wings hyaline, halteres yellow.

Natural enemies:

During the course of the study a larval eulophid parasite, *Neochrysocharis* sp. and a pupal braconid parasite, *Opius* sp. were recorded. The extent of parasitisation by these parasites were 2 to 84% and 40% respectively.

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25. A NEW HOST OF THE BRINJAL SHOOT AND FRUIT BORER *LEUCINODES ORBONALIS* GUEN, AND ITS BIOLOGY

Leucinodes orbonalis Guen. is generally considered a serious pest of brinjal (*Solanum melongena* L.) in which it bores the shoots and fruits. It has also been recorded attacking many other plants.

We observed the pest boring the shoots and fruits of tomato (*Lycopersicum esculentum* Miller) in Bhubaneswar. The infestation of the winter crop in 1964 was 5 to 10%. As it was the first record of *Leucinodes orbonalis* on tomato, it was thought worthy to study the life history of the insect, and to compare its biology and life history with that on the weed *Solanum nigrum* and on brinjal.

A large number of larvae of *Leucinodes orbonalis* were collected from the field and reared to adult stage in the laboratory, in specially designed breeding cages, containing potted brinjal plants. After mating, the female moth laid eggs on the plant inside the cage. The newly hatched larvae were taken from the plant by a camel hair brush and reared on fruits of brinjal, tomato and *Solanum nigrum*. Newly hatched larvae when released on the fruits, hide below the calyx by webbing externally and then bore into the fruits to develop inside. As the larvae grows, it cannot accomodate itself in the fruit of *Solanum nigrum*. Therefore it comes out and webs 3-4 such fruits together and feeds on them by remaining inside the web. Damaged fruits were replaced from time to time, by fresh ones.

When full grown, the larvae come out of the fruit to search for a suitable site for pupation. Such larvae were released inside 4" diameter petri dishes loosely fitted with a plain paper base and covered with a lid. The larvae moved below the paper base and spun cocoons and pupated. The moths which emerged remained confined inside the petri dish.

Newly hatched larvae bore into brinjal, tomato and *Solanum nigrum* fruits in 30, 13 and 3 minutes respectively. The average length of larval period was 12, 13 and 15 days and pupal period was 11, 11 and 10 days respectively. Variations in the growth of the insect on the three hosts was noticed while rearing. The respective full grown larvae measured 16·0-20·0 mm., 16·0-20·0 mm. and 10·0-13·0 mm. in length and 2·5-4·0 mm., 2·5-3·5 mm. and 2·0-2·5 mm. in breadth. Cocoons spun by the full grown larvae reared on brinjal and tomato were of the same size 16·0-20·0 mm., 6·0-8·0 mm., but Cocoons from *Solanum nigrum* were 8·0-10·0 mm., 3·5-4·0 mm. The length of the pupae formed inside the respective Cocoons was 8·0-13·0 mm., 8·0-13·0 mm. and 8·0-10·0 mm. and breadth 2·5-3·5 mm., 2·5-3·0 mm., and 2·0-2·5 mm. Colour and texture of the Cocoons of *Leucinodes orbonalis* is black and leathery on brinjal, dull black, thin and papery on tomato, and ashy, thin and papery on *Solanum nigrum*. Average wing expansion of the moths from brinjal and tomato was equal — 18·0-22·0 mm. in the male and 20·0-24·0 mm. in the female. Male and female moths from *Solanum nigrum* had a wing expansion of 17·0-19·0 mm. and 17·0-20·0 mm. respectively. A difference in the fecundity of the moths

was also noticed. Female moths reared from brinjal, tomato and *Solanum nigrum* laid on an average 152, 113 and 38 eggs. All the eggs were equally viable and hatched after an incubation period of 6 days. The total life cycle of *Leucinodes orbonalis* Guen. on the respective hosts was 27, 28 and 29 days. During the course of the study the average minimum and maximum laboratory temperatures were 79·5°F and 82·0°F and the relative humidity was 89%.

Tomato and *Solanum nigrum* are thus suitable alternate hosts of the brinjal shoot and fruit borer *Leucinodes orbonalis* Guen. Though the growth of the borer on *Solanum nigrum* is poor. However, it completes its life cycle on this host also. Moths from *Solanum nigrum* which were smaller in size with reduced wing spread laid far less eggs in comparision to the moths from the two other hosts. This shows that the size and vigour of the moths are correlated with their fecundity.

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26. CHAFER BEETLE, *ADORETUS* SP. (COLEOPTERA: SCARABAEIDAE) A NEW PEST ON GUAVA IN INDIA

Guava (*Psidium guajava* I.) is an important fruit crop in India, the State of Uttar Pradesh being the largest grower with approximately 9,840 hectares under it and accounting roughly for over one-third of the entire guava crop of the country (Hayes 1961). Adult Chafer beetles *Adoretus* sp. (Coleoptera: Scarabaeidae) were recorded feeding on its leaves in the Himalayan foothills in Uttar Pradesh. The infestation was mainly during the monsoon season and thereafter and the damage was fairly serious. We presume that this is the first record of the pest on guava in India.

The adult *Adoretus* sp. is about 11 mm. long and light greenish-brown in colour. They are strictly nocturnal and usually solitary. They feed on the foliage, causing in the beginning small irregular holes, usually starting from the middle of the infested lamina and extending outwards towards the margin. A large number of irregular holes 2 to 4 mm. in diameter is thus formed on the guava leaves. Depending upon the degree of damage to the foliage, the pest reduces the yield, and in serious cases the number of fruits is substantially lowered.